

A randomized controlled effectiveness trial of cognitive behavior therapy for post-traumatic stress disorder in terrorist-affected people in Thailand

RICHARD A. BRYANT¹, SUPARAT EKASAWIN², SOMCHAI CHAKRABHAND², SOAWALUK SUWANMITRI², ORAWAN DUANGCHUN², THANANET CHANTALUCKWONG²

¹University of New South Wales, Sydney, New South Wales, Australia; ²Thai Department of Mental Health, Bangkok, Thailand

Although cognitive behaviour therapy (CBT) is the treatment of choice for post-traumatic stress disorder (PTSD), there is no evidence of its success with PTSD patients still under direct threat of terrorist attacks. This study reports the first randomized controlled trial of CBT for PTSD terrorist-affected people. Twenty-eight survivors of terrorist attacks in southern Thailand were randomized to 8 sessions of either CBT or treatment as usual (TAU). CBT was modified to accommodate the realistic threats facing patients. There were independent assessments conducted before, immediately after, and 3 months following treatment. Main outcome measures included symptoms of PTSD (PTSD Symptom Scale - Interview), depression (Beck Depression Inventory) and complicated grief (Inventory of Complicated Grief). CBT resulted in significantly greater reduction in symptoms, including PTSD, depression, and complicated grief, at follow-up than TAU. Relative to TAU, CBT had stronger effect sizes at follow-up for PTSD, depression, and complicated grief. More patients in the CBT condition (75%) achieved high end-state functioning than participants in the TAU (33%). This preliminary evidence suggests that PTSD, depression, and complicated grief can be effectively treated despite ongoing threats of terrorism. Further, it demonstrates that non-specialist mental health workers in a non-western setting can be efficiently trained in using CBT, and this training can translate into successful treatment gains in trauma-affected individuals.

Key words: Cognitive behaviour therapy, post-traumatic stress disorder, complicated grief, terrorism, culture

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Cognitive behaviour therapy (CBT) is the treatment of choice for post-traumatic stress disorder (PTSD) (1-3). However, there is little information concerning the application of CBT in contexts where terrorism continues to directly threaten people with PTSD. In the context of repeated terrorist attacks across the world in recent years, the utility of CBT for people affected by ongoing terrorism has attracted marked attention. There is evidence that CBT can be efficacious in treating terrorist-related PTSD (4), but this evidence is limited to post-terrorism environments in which treatment occurs in a context of relative safety. To date, no randomized controlled trials of CBT have been reported in the context of ongoing active terrorist attacks.

There are reasons to question how CBT will function in contexts of ongoing terrorist attacks. The two major components of CBT involve exposure therapy and cognitive restructuring. Exposure therapy involves having the patient confront reminders of the trauma, typically by focusing on memories of the trauma or remaining with situational reminders (5). This practice presumes that extinction learning occurs, in which initial fear conditioning is inhibited by learning that trauma reminders now signal safety rather than danger (6). This goal may be difficult to reach, however, when reminders may be occurring frequently and actually result in harm to self or others – as is the case in the context of active terrorism. CBT has been shown to be efficacious with patients who are suffering ongoing threat, such as those suffering domestic violence (7). Terrorism may represent a more pervasive threat, however, because it involves intentional attacks on a communal basis, and this may compli-

cate the capacity for extinction learning, because of the frequent occurrence of harmful events happening to people in one's immediate environment.

Cognitive restructuring is based on cognitive models which posit that PTSD patients catastrophize about their reactions to the trauma and the likelihood of further harm (8). Accordingly, cognitive restructuring teaches the patient not to appraise the traumatic event or its aftermath in an excessively negative manner. This task may be hindered when appraisals about future threat may be partially realistic because of the actual likelihood of future harm. For example, people who have been exposed to a terrorist attack in a region that is frequently bombed may report an appraisal that their world is dangerous and they can never feel safe; this appraisal may be largely justified because of the frequency of bombings. For this reason, recent commentaries have noted the need to tailor cognitive restructuring to explicitly acknowledge the possibility of actual threat and to determine the relative risk when using cognitive restructuring (9). This approach attempts to teach the patient to appraise the likelihood of risk in realistic terms, and also understand the benefits of accepting a certain level of risk (e.g., being able to leave one's house and complete daily duties).

Another critical omission in the literature is the absence of effectiveness studies that adapt evidence-based approaches to terrorist-affected settings in non-western environments. This study attempted an effectiveness evaluation by adapting CBT in a non-western country and using local health providers. We conducted a randomized controlled trial of terrorism survivors in southern Thailand, where over 3,000 people

have been killed since 2004. This terrorist activity has arisen from extremist Muslim separatists operating against the Thai government. Many terrorist activities in the three southern provinces of Thailand have targeted schools, health workers, and other non-combatant people. We compared CBT and treatment as usual (TAU), which involved generic counselling, to treat PTSD, depression, and complicated grief.

MATERIALS AND METHODS

The study based its sample sizes on a previous trial that compared exposure combined with cognitive restructuring against supportive counselling (10). Using these data on treatment completers at 6 month follow-up, we estimated that, with 50% power and two-sided $\alpha = .05$, $n=30$ would be needed to detect an anticipated meaningful follow-up difference on PTSD severity.

Twenty eight people (27 female, 1 male) were identified by the Thai Department of Mental Health, who were seeking treatment through Yala Hospital in southern Thailand between May 2007 and February 2009 for PTSD after direct exposure to a terrorist attack. Inclusion criteria were that the patient had been directly exposed to a terrorist attack and had a primary diagnosis of PTSD based on DSM-IV criteria (11). Exclusion criteria included severe suicidal risk, psychosis, substance dependence, and aged less than 17 years or more than 70 years. No patients were excluded on these criteria. Patients were randomized according to a random numbers system administered by health officials in Bangkok (fully independent of counsellors and the study co-ordinator) to either CBT ($n=16$) or TAU ($n=12$) (see Figure 1). A family member was killed in the attacks in 24 cases (14 in CBT, 10 in TAU) and all these patients also suffered complicated grief (12). Recruitment to the study was terminated prematurely because at that stage of the study terrorist attacks increased and health workers were being targeted by the terrorists. Accordingly, the study was forced to terminate with a sample of 28 because of risks to health workers providing therapy. Participant flow during the study is presented in Figure 1.

PTSD diagnosis was determined by the PTSD Symptom Scale - Interview (PSS-I) (13). This semi-structured interview consists of 17 PTSD symptoms that are rated on a 0-3 scale combining frequency and severity in the past 2 weeks. It has very good inter-rater reliability for PTSD diagnosis ($r=.91$) and severity ($r=.97$) (13). Depression was assessed using the Beck Depression Inventory-II (14), which is a self-report measure with sound psychometric properties (14). Complicated grief was assessed using the Inventory of Complicated Grief (15); this self-report measure assesses the core symptoms of complicated grief, which involves persistent yearning for the deceased, emotional pain following the loss, bitterness, hopelessness, and loss of identity (12). All measures were translated into Thai and back-translated into English.

Following informed consent, patients in CBT were offered 8 weekly individual 60-min sessions that included education

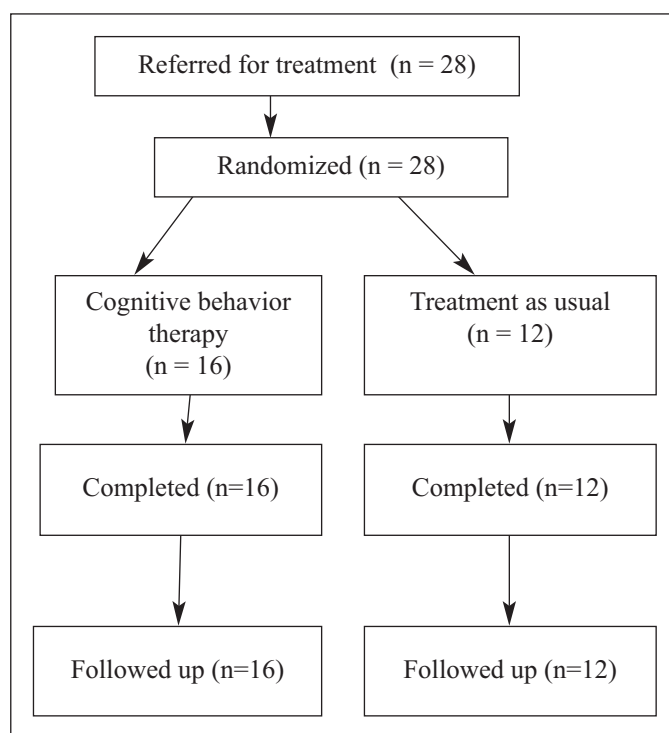


Figure 1 Patient participation in the study

about trauma, anxiety management techniques, repeated exposure to trauma memories, *in vivo* exposure to avoided situations, and cognitive restructuring to modify catastrophic appraisals about future harm. Therapy was conducted by Thai psychologists or psychiatric nurses who were trained to use the treatment manual in three 2-day workshops occurring over 12 months. Each workshop comprised didactic training, modelling, and role-plays to ensure that each therapist was competent in therapy skills. Therapists rehearsed clinical skills with patients during the four months after the first and the second workshop, and received supervision on treated cases during the second and third workshop. During the trial itself, therapists conducted treatment without formal supervision.

The first session of CBT comprised education about trauma reactions. The second session commenced progressive muscle relaxation training. Rather than relying exclusively on western methods of relaxation training (e.g., muscle relaxation and breathing control), relaxation also encouraged Thai meditation techniques. This practice was reviewed in each subsequent session. The second session commenced prolonged imaginal exposure to traumatic memories. Forty minutes of each session was devoted to participants reliving their trauma by focusing attention on their memories and engaging with their affective responses (16). In the second session, participants were also taught to create a hierarchy of feared situations. In session 3, *in vivo* exposure was commenced in which participants were instructed to remain in feared situations until anxiety reduced by 50%, commencing with the least feared situations, and then increasing exposure

to more feared situations. In session 3, cognitive restructuring was commenced. Participants were taught to identify unrealistic and catastrophic thoughts and to modify thoughts by Socratic questioning, probabilistic reasoning, and evidence-based thinking. Cognitive restructuring was modified to recognize the realistic threats of possible terrorist attacks. Specifically, treatment taught patients to evaluate the absolute risk of being harmed and to recognize the benefits of accepting a level of risk in order to permit normal functioning (e.g., attending the local market to buy the family food, despite the possibility that markets were targeted for bombings) (9). Each of these components were rehearsed in each session, and relapse prevention was conducted in the final session. TAU comprised the equivalent number of sessions of supportive counselling being provided by psychiatrists who were not trained in CBT.

At the completion of treatment sessions, therapists compiled checklists that itemized each of the therapy components. Therapists providing CBT indicated on their checklists that all patients in CBT received education, anxiety management, imaginal exposure, and cognitive restructuring. Three patients did not receive *in vivo* exposure. No patients in TAU received anxiety management, exposure, or cognitive restructuring. Assessments conducted at post-treatment and 3 months following treatment were conducted by independent personnel unaware of patients' treatment condition.

RESULTS

There were no differences between conditions in terms of age, gender, religion, number of therapy sessions, or pre-treatment psychopathology scores (see Table 1). There were no treatment drop-outs, and so analyses focus on all patients who were randomized into the study.

A multivariate analysis of covariance (MANCOVA) on post-treatment PSS, BDI-II, and ICG scores indicated a significant main effect: $F(3,21) = 7.02$, $p = 0.002$, $\eta^2 = .50$. Post-

Table 1 Characteristics of the participants in the trial

	CBT	Treatment as usual	Test	<i>p</i>
Age (years, mean \pm SD)	42.3 \pm 6.3	43.9 \pm 11.9	$t(26) = 0.46$	0.65
Time since trauma (months, mean \pm SD)	13.1 \pm 6.6	15.2 \pm 8.0	$t(26) = 0.76$	0.45
Number of sessions (mean \pm SD)	6.6 \pm 1.0	5.5 \pm 2.5	$t(26) = 1.65$	0.11
Gender				
Male	0	1	$\chi^2 = 1.38$	0.24
Female	16	11		
Marital status (%)				
Single/Widowed	87	83	$\chi^2 = 0.10$	0.76
Married	13	17		
Religion				
Buddhist	11	5	$\chi^2 = 2.05$	0.15
Muslim	5	7		
Employed (%)	93	75	$\chi^2 = 1.97$	0.16
Education (%)				
Less than high school	44	42	$\chi^2 = 0.01$	0.91
At least high school	56	58		

CBT – cognitive behaviour therapy

treatment ANCOVAs indicated that patients who received CBT scored lower on the PSS, BDI-II, and ICG than patients in the TAU condition (Table 2). The MANCOVA on follow-up symptom scores also indicated a significant main effect: $F(3,21) = .11$, $p = 0.02$, $\eta^2 = .37$; CBT resulted in lower PSS, BDI-II, and ICG scores than TAU.

Treatment effect sizes were calculated between treatment conditions at post-treatment and follow-up. We derived Cohen's *d* effect size by calculating the mean difference between assessments of each treatment condition and dividing this by the pooled standard deviation (17). We used Hedges *G* effect sizes to correct for variations due to small sample sizes (18). Between condition effect sizes (Table 2) indicated that CBT had large effects relative to TAU for PTSD, depression and complicated grief. Effect sizes for CBT prior to and at 3

Table 2 Psychopathology measures at pre-treatment, post-treatment and follow-up (mean \pm SD)

Measure	CBT (n= 16)	Treatment as usual (n= 12)	F (df = 25)	<i>p</i>	η^2	Between condition effect size
<i>Pre-treatment</i>						
PSS	26.8 \pm 10.0	22.7 \pm 12.4	0.93	0.34	0.03	-0.36 (95% CI: -0.40-1.11)
BDI-II	22.3 \pm 13.4	17.8 \pm 14.7	0.71	0.41	0.03	-0.31 (95% CI: -0.44-1.06)
ICG	24.3 \pm 10.2	24.2 \pm 10.1	1.32	0.26	0.05	0.01 (95% CI: -0.74-0.76)
<i>Post-treatment</i>						
PSS	4.1 \pm 8.0	12.3 \pm 8.4	13.49	0.001	0.35	0.96 (95% CI: 0.17-1.75)
BDI-II	3.2 \pm 8.7	11.3 \pm 11.3	10.12	0.004	0.29	0.81 (95% CI: 0.03-1.58)
ICG	10.7 \pm 5.8	15.2 \pm 9.3	14.52	0.001	0.37	0.58 (95% CI: -0.18-1.35)
<i>Follow-up</i>						
PSS	7.5 \pm 11.1	15.2 \pm 13.1	8.63	0.007	0.26	0.62 (95% CI: -0.14-1.39)
BDI-II	6.4 \pm 12.2	11.0 \pm 11.6	11.15	0.003	0.31	0.37 (95% CI: -0.38-1.13)
ICG	11.5 \pm 7.2	14.8 \pm 9.4	10.94	0.003	0.30	0.38 (95% CI: -0.37-1.38)

CBT – cognitive behavior therapy; PSS – PTSD Symptom Scale; BDI-II – Beck Depression Inventory, 2nd ed.; ICG – Inventory for Complicated Grief

months after treatment were 1.78 (95% CI: 0.96-2.60) for PSS, 1.22 (95% CI: 0.46-1.97) for BDI-II, and 1.41 (95% CI: 0.64-2.18) for ICG. Effect sizes for TAU were 0.57 (95% CI: 0.25-1.38) for PSS, 0.45 (95% CI: -0.36-1.26) for BDI-II, and 0.41 (95% CI: -0.39-1.22) for ICG.

We calculated high end-state adjustment as being below 19 on the Clinician-Administered PTSD Scale (CAPS) (combining frequency and intensity scores) as a measure of the absence of PTSD (19), and below 10 on the BDI-2 (20). More patients in the CBT condition (75%) achieved high end-state functioning than participants in the TAU (33%) condition: ($\chi^2 = 4.86, p < 0.05$).

We also calculated the number of patients needed to treat as 1 divided by the proportion responding to CBT as an estimate of the number of patients who would need to be given CBT for one of them to achieve a response outcome he would not have achieved with TAU. Efficacious treatments typically have a number needed to treat between 2 and 4 (21). The number needed to treat was 2.40.

DISCUSSION

This study represents the first demonstration of the efficacy of CBT to successfully treat PTSD in people who are living with significant threat from terrorist activity. Although the success of CBT has been demonstrated before in populations who live with potential threat, such as domestic violence (7), this study highlights that CBT can also be usefully applied in settings where very regular attacks are made upon communities in which the patient lives.

Several points emerge from this study. First, therapy was specifically adapted so that it accommodated the particular needs of people currently under terrorist threat. Participants in this study were regularly exposed to regional bombings and shootings during the course of therapy. Therapy emphasized the advantages of taking reasonable risks (i.e., attending local markets allows the individual to purchase required supplies for their children) and also the importance of evaluating the absolute risk of harm (i.e., low statistical probability of being at a specific market when a bomb explodes) (9). Despite the difficulties associated with this reasoning, patients appear to have recognized the utility in accepting some level of risk in order to maintain some level of functioning.

Second, the finding that there were no adverse effects or drop-outs extends previous reports that exposure therapy is not aversive (22,23). The finding that participants tolerated, and benefited from, exposure even in the context of ongoing terrorist attacks counters the notion that exposure may not be applicable in populations experiencing anxiety as a result of actual threat. Extinction learning presumes that the reminder of the trauma (conditioned stimulus) is a benign reminder that signals safety to the trauma survivor (6). It seems that even when the reminders are periodically associated with actual threat, exposure therapy achieved extinction learning.

Third, the therapists conducting this trial had fundamental

training in mental health and had no previous knowledge or experience with CBT. They were trained in these techniques in a 2-day workshop that involved didactic training and provision of a manual, followed by two separate 2-day workshops held four months apart. By rehearsing CBT with trauma survivors between training workshops, therapists were able to receive feedback and learn more refined skills. The success of their therapy confirms previous reports that brief training of CBT to lay counsellors can result in significant treatment outcomes in the trauma survivors they treat (4,24).

Fourth, this trial illustrates the capacity for CBT to be successfully implemented into a non-western culture in ways that build on the culture's strengths. Some commentators argue that western evidence-based therapy approaches may not be appropriate to non-western cultures (25). In the planning stage of the program, there was initial concern that exposure may not be acceptable to Thai therapists or trauma survivors, because eliciting distress in others and expressing distress is not encouraged in Thai culture; following explanation of the rationale for exposure, however, this strategy was implemented. Therapy also usefully encouraged Buddhist meditation in those participants who were skilled in this practice as an important adjunct to western relaxation methods. Further, Buddhist techniques of distancing oneself from one's thoughts (similar to mindfulness strategies in western psychotherapy (26)) were integrated into cognitive restructuring to reduce preoccupation with catastrophic thinking.

Fifth, CBT resulted in marked reductions in complicated grief reactions. Recent CBT trials including exposure-based therapy, often complemented with other strategies to reduce grieving (e.g., promoting positive memories of the deceased, goal setting) have been successful in reducing grief symptoms (27,28). The current trial adds to the evidence that treatment strategies applied to PTSD (exposure, cognitive restructuring) have benefits in reducing persistent grief, and suggests that similar change mechanisms may be involved in reduction of these symptoms.

We note that this study's conclusions are limited by the small sample size, lack of independent fidelity checks, and rather short-term follow-up. These limitations were unavoidable because of the dangerous context in which the trial was conducted and the limited resources available in southern Thailand. Nonetheless, this trial is the first demonstration that culturally adapted CBT is efficacious in reducing PTSD, depression, and grief reactions in the context of ongoing terrorist attacks.

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